TECHNICAL GUIDANCE

TO MAINTAIN CONSTANT FLOW

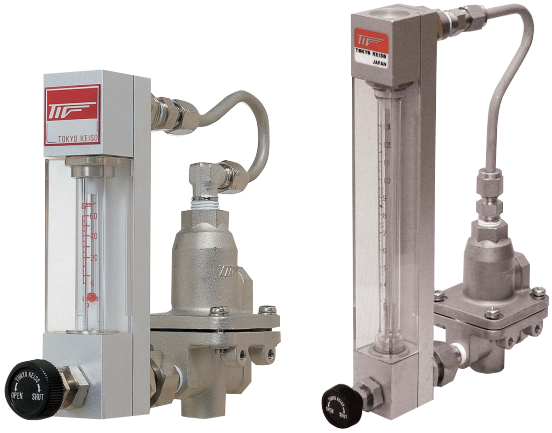
C Series PURGE SET

FLOWMETER WITH CONSTANT FLOW VALVE

GENERAL

C series Constant Flow Valves keep flow rate of gases or liquids even when the supply or load pressure changes. Control valve with diaphragm automatically acts following the change of pressure. They are normally delivered together with flowmeter as a "Purge set".

Primary(Inlet) pressure variation control type and Secondary(Outlet) pressure variation control type are ready to meet all possible applications.



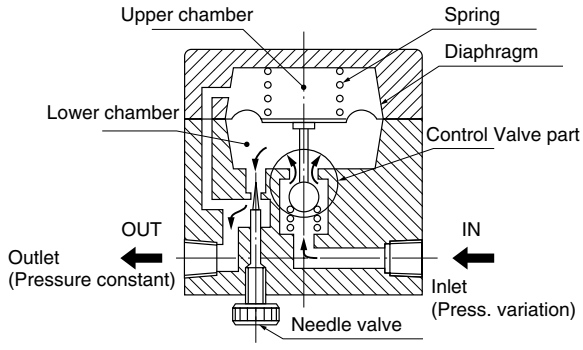
LINEUP

Type	**C-11** P_1(INLET) Variation **C-12** P_2(OUTLET) Variation	**C-21** P_1(INLET) Variation **C-22** P_2(OUTLET) Variation	**C-31** P_1(INLET) Variation **C-32** P_2(OUTLET) Variation	**C-41** P_1(INLET) Variation **C-42** P_2(OUTLET) Variation
Applicable Fluid	Gases only	Gases and liquids	Gases and liquids	Gases and liquids
Max.Process Press (MPa)	0.7	1	0.8	0.8
Max.Process Temp (°C)	120	120	120	120
Controllable Dp range (MPa)	C-11 0.03~0.3 C-12 0.05~0.3	0.06~0.4	0.1~0.5	0.1~0.6
Control Accuracy (%,F.S.)	±3	±5	±5	±5
Process connection	Rc 1/8 thread	Rc 1/4 thread	Rc 3/8 thread	Rc 1/2 thread
Approx. MASS (kg)	0.2	0.9	2.3	8.0

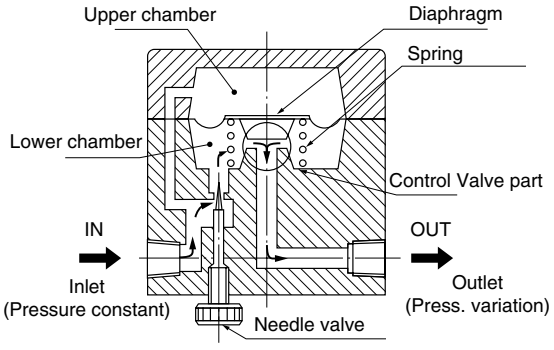
*: It is general data, and the maximum temperature may change by terms of use and environment.

OPERATION PRINCIPLE

In the PRIMARY (INLET) PRESSURE VARIATION CONTROL TYPE, the fluid, of which inlet pressure varies, is introduced from IN to the lower chamber of the C series Constant Flow Valve. The load pressure (Secondary pressure) is connected to the upper chamber.
The differential pressure between the lower chamber and the upper chamber is always constant thanks to the function of the Spring and the Diaphragm. The differential pressure across the needle valve is kept always constant and the flow rate of the fluid is proportional only to the opening of needle valve. The opposite action is taken for SECONDARY (OUTLET) PRESSURE VARIATION CONTROL TYPE and the flow rate is kept also constant even when the load pressure changes.



PRIMARY (INLET) PRESSURE VARIATION CONTROL TYPE (C-□1)



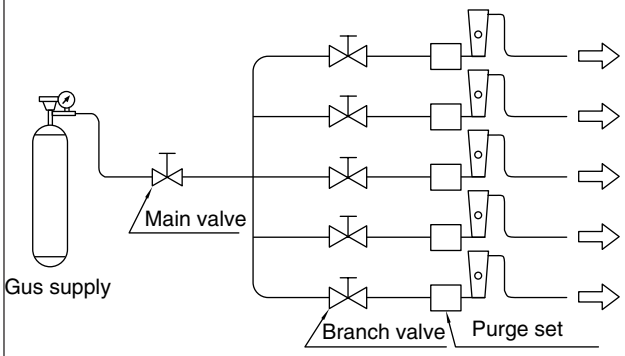
SECONDARY (OUTLET) PRESSURE VARIATION CONTROL TYPE (C-□2)

TOKYO KEISO CO.,LTD.

TG-F746-4E JUN. 2005K
TG-F746-6E MAY. 2013K

APPLICATIONS

● SUPPLY PRESSURE VARIATION

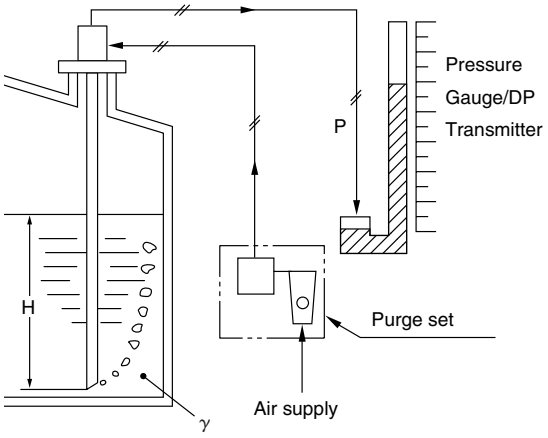


As shown above, in case one large supply line branches into several lines and the supply pressure changes because of stoppage of some branches. Primary Pressure Variation type Purge set will be suitable in keeping the purging volume of fluid.

Recommended Model of Purgeset:

CP-□1-□□□

● LEVEL MEASUREMENT

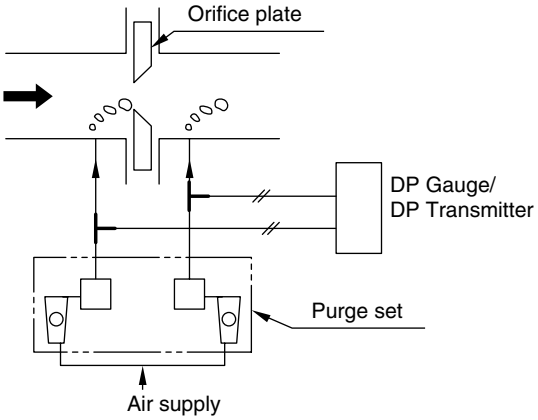


Liquid level in tanks is measured by the Back-pressure at the edge of purging pipe. The outlet pressure at the tank bottom changes depending on the liquid level, and constant bubbling is required. Thus, Secondary Pressure Variation type purge set is used for this application. A DP transmitter is often connected to pressure line instead of pressure gauge for remote transmission.

Recommended Model of Purgeset:

CP-□2-□□□, CP-22-100-B $H = \frac{P}{\gamma}$

● PURGING FOR ORIFICE PLATE APPLICATION

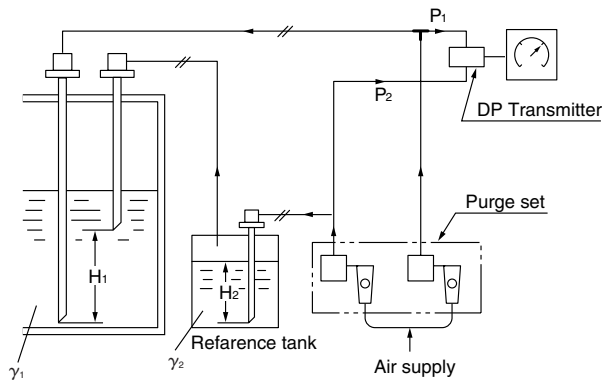


For the measurement of flow rate of corrosive liquids and/or liquids with solids by orifice plate, an equal pressure purging both to Hi and Lo pressure parts so as not to introduce liquid and/or solids into DP Pressure lead pipe. Dual mount type purge set used.

Recommended Model of Purgeset:

CP-221-2A□

● DENSITY MEASUREMENT



For continuous measurement of density of liquid in tanks, Air purging system is used as shown above.

$$\gamma_1 = \frac{(P_1-P_2)+\gamma_2 H_2}{H_1}$$

Recommended Model of Purgeset:

CP-221-2A□

C-1 TYPE

● STANDARD SPECIFICATION

MODEL IDENTIFICATION:

C-11 INLET PRESSURE VARIATION CONTROL TYPE

C-12 OUTLET PRESSURE VARIATION CONTROL TYPE

AVAILABLE FLOW RANGES:

GASES : Max. 3L/min (nor) *1

MAX.OP.PRESS. : 0.7MPa

TEMP. : Max. 120°C

*: It is general data, and the maximum temperature may change by terms of use and environment.

Min. Required DP : 0.03MPa *2

Max. Controllable DP : 0.3MPa

CONTROL ACCURACY : ±3%(F.S.)

MATERIAL CONSTRUCTION :

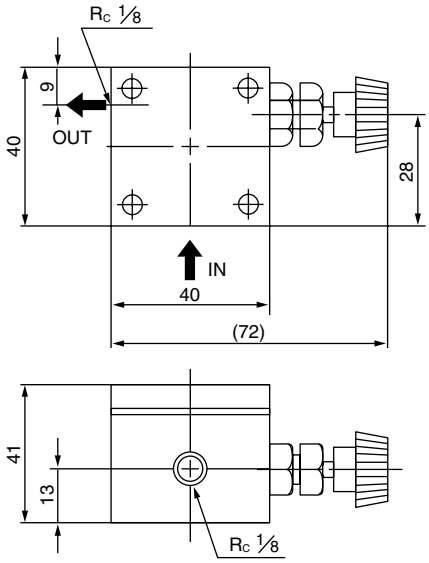
PART NAME	MATERIAL	
	STANDARD	OPTION
BODY	SUS304	Aluminum,SUS316
DIAPHRAGM	CR	FPM
SPRING	SUS304	SUS316
SEAL	NBR	FPM

STANDARD PROCESS CONNECTION : Rc1/8 Thread

*1: Air, 0°C, 0MPa

*2: 0.05MPa for **C-12** version

● DIMENTION OF CONSTANT FLOW VALVE UNIT



The above figure shows Type C-11 which is the primary pressure fluctuation type.

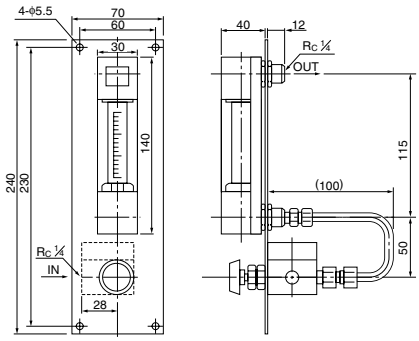
For Type C-12 of the secondary pressure fluctuation type, the direction of “IN” and “OUT” gets reverse, and the height shall be 35mm instead of 41mm.

● EXAMPLES OF COMBINATION WITH FLOWMETER

INLET PRESSURE VARIATION CONTROL TYPE

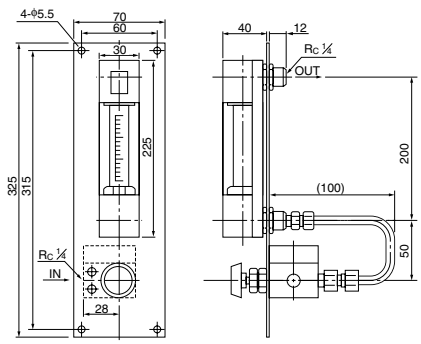
CP-11-100

Possible Scale Ranges as PURGE SET
Air Min.10~100mL/min (nor)
(0°C, 0MPa) Max.0.3~3L/min (nor)



CP-11-200

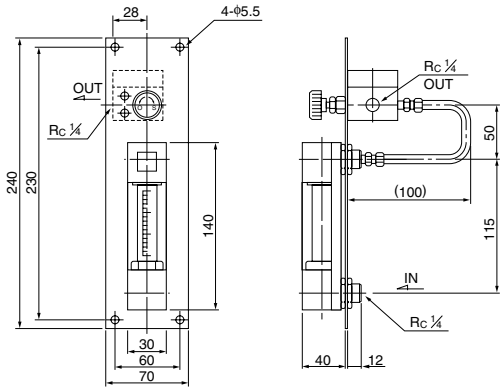
Possible Scale Ranges as PURGE SET
Air Min.10~100mL/min (nor)
(0°C, 0MPa) Max.0.3~3L/min (nor)



OUTLET PRESSURE VARIATION CONTROL TYPE

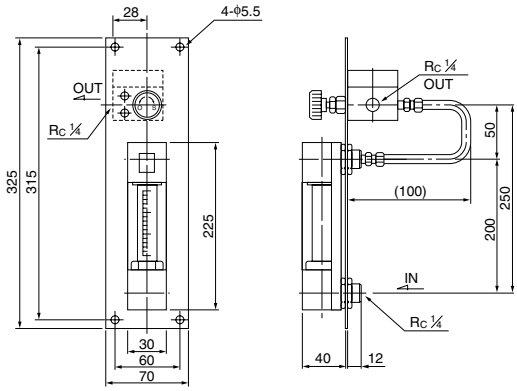
CP-12-100

Possible Scale Ranges as PURGE SET
Air Min.10~100mL/min (nor)
(0°C, 0MPa) Max.0.3~3L/min (nor)



CP-12-200

Possible Scale Ranges as PURGE SET
Air Min.10~100mL/min (nor)
(0°C, 0MPa) Max.0.3~3L/min (nor)



C-2 TYPE

● STANDARD SPECIFICATION

MODEL IDENTIFICATION:

C-21 INLET PRESSURE VARIATION CONTROL TYPE

C-22 OUTLET PRESSURE VARIATION CONTROL TYPE

AVAILABLE FLOW RANGES:

LIQUIDS	:	Max. 2L/min. *1
GASES	:	Max. 50L/min (nor) *2
MAX.OP.PRESS.	:	1MPa
TEMP.	:	Max. 120°C

*: It is general data, and the maximum temperature may change by terms of use and environment.

Min. Required DP : 0.06MPa

Max. Controllable DP : 0.4MPa

CONTROL ACCURACY : ±5%(F.S.)

MATERIAL CONSTRUCTION :

PART NAME	MATERIAL	
	STANDARD	OPTION
BODY	SCS14	–
DIAPHRAGM	CR	FPM
SPRING	SUS304	SUS316
SEAL	NBR	FPM

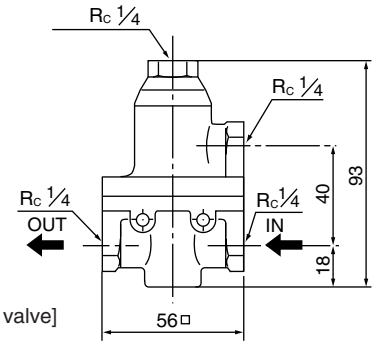
STANDARD PROCESS CONNECTION : Rc1/4 Thread

*1: Water (Density 1.0g/cm^3, Viscosity 1.0cP)

*2: Air, 0°C, 0MPa

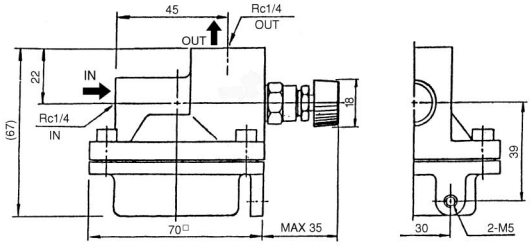
CP-21-100

● DIMENTION OF CONSTANT FLOW VALVE UNIT



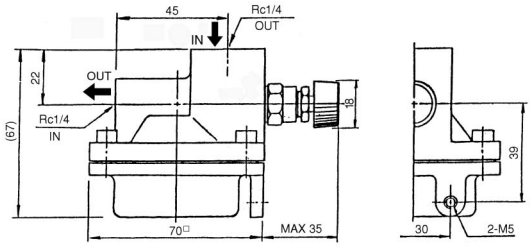
[Without valve]

C-21 TYPE



[With valve]

C-21 TYPE



C-22 TYPE

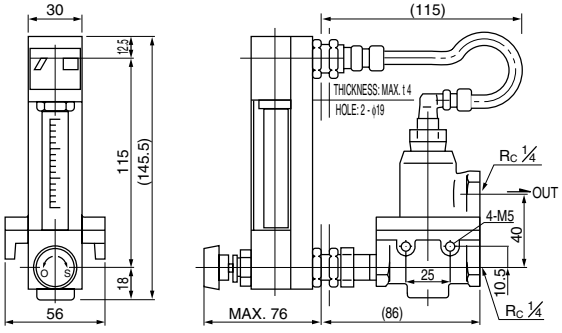
● EXAMPLES OF COMBINATION WITH FLOWMETER

INLET PRESSURE VARIATION CONTROL TYPE (Also used for OUTLET PRESSURE VARIATION in liquid applications)

CP-21-100

Possible Scale Ranges as PURGE SET

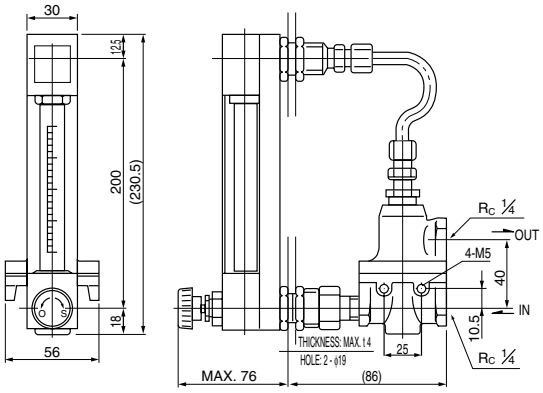
Water	Min.5~50mL/min.
	Max.0.4~2L/min.
Air	Min.0.1~1L/min (nor)
(0°C, 0MPa)	Max.5~50L/min (nor)



CP-21-200

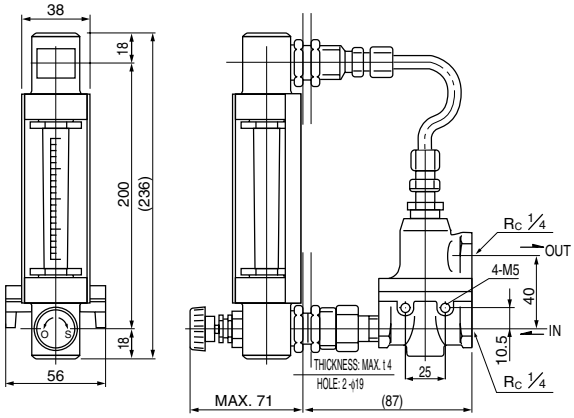
Possible Scale Ranges as PURGE SET

Water	Min.7~70mL/min.
	Max.0.2~2L/min.
Air	Min.0.1~1L/min (nor)
(0°C, 0MPa)	Max.5~50L/min (nor)



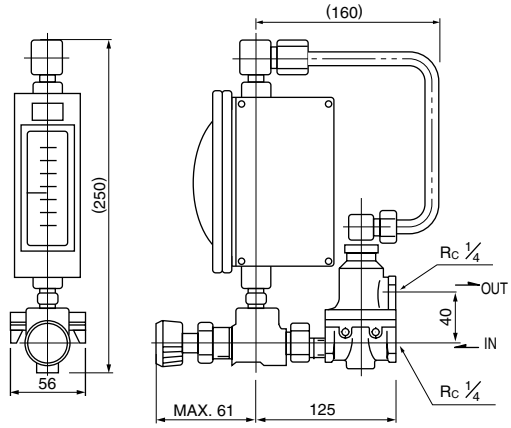
CP-21-400

Possible Scale Ranges as PURGE SET
Water Min.7~70mL/min.
Max.0.2~2L/min.
Air Min.0.1~1L/min (nor)
(0°C, 0MPa) Max.5~50L/min (nor)



CM-21-900

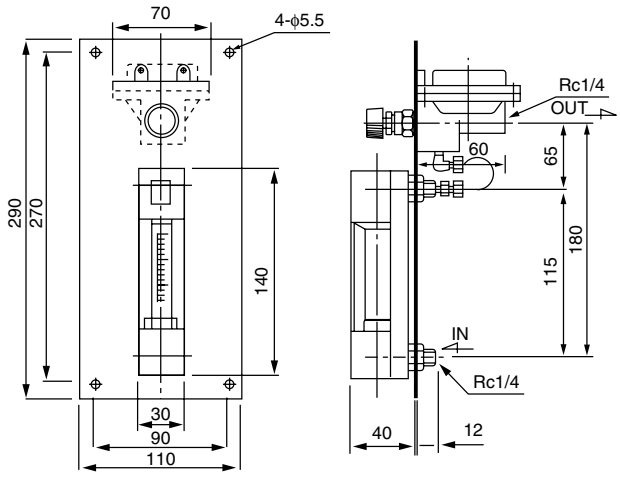
Possible Scale Ranges as PURGE SET
Wate Min.8~40mL/min.
Max.0.2~2L/min.
Air Min.0.2~1L/min (nor)
(0°C, 0MPa) Max.6~60L/min (nor)



OUTLET PRESSURE VARIATION CONTROL TYPE

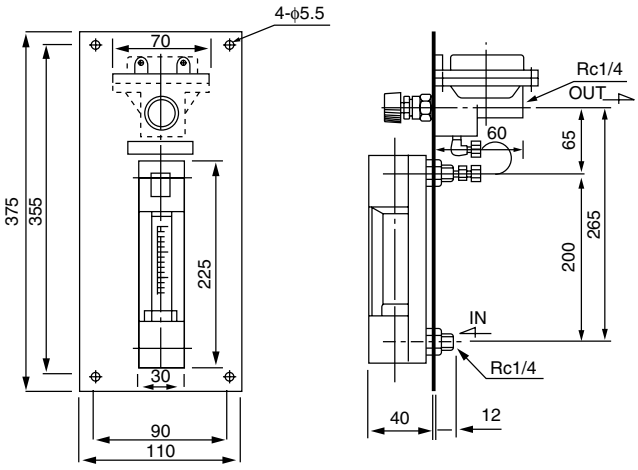
CP-22-100

Possible Scale Ranges as PURGE SET
Air Min.0.1~1L/min (nor)
(0°C, 0MPa) Max.5~50L/min (nor)



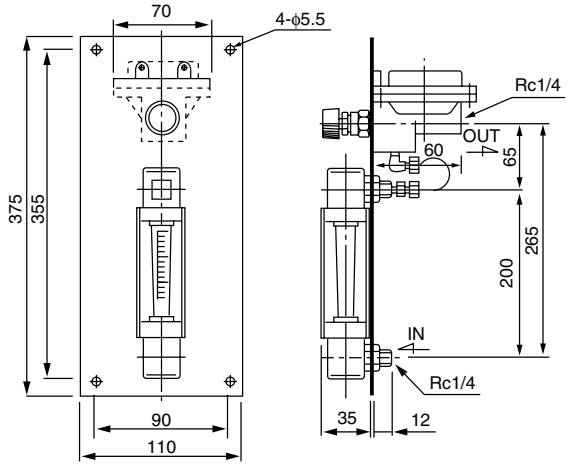
CP-22-200

Possible Scale Ranges as PURGE SET
Air Min.0.1~1L/min (nor)
(0°C, 0MPa) Max.5~50L/min (nor)



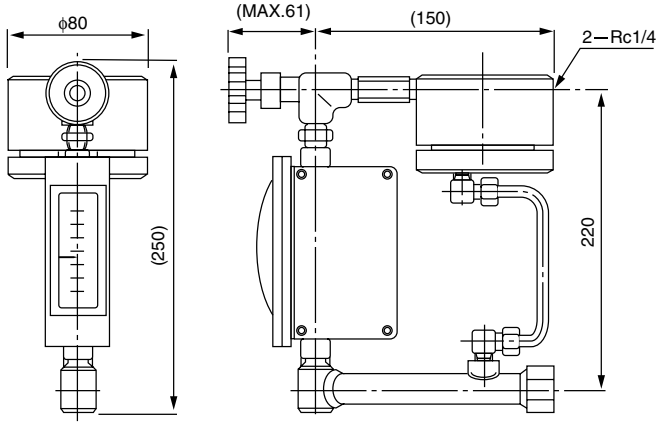
CP-22-400

Possible Scale Ranges as PURGE SET
Air Min.0.1~1L/min (nor)
(0°C, 0MPa) Max.5~50L/min (nor)



CM-22-900

Possible Scale Ranges as PURGE SET
Air Min.0.2~1L/min (nor)
(0°C, 0MPa) Max.6~60L/min (nor)



C-3 TYPE

● STANDARD SPECIFICATION

MODEL IDENTIFICATION:

C-31 INLET PRESSURE VARIATION CONTROL TYPE

C-32 OUTLET PRESSURE VARIATION CONTROL TYPE

AVAILABLE FLOW RANGES:

LIQUIDS : Max. 5L/min. *1

GASES : Max. 150L/min (nor) *2

MAX.OP.PRESS. : 0.8MPa

TEMP. : Max. 120°C

*: It is general data, and the maximum temperature may change by terms of use and environment.

Min. Required DP : 0.1MPa *2

Max. Controllable DP : 0.5MPa

CONTROL ACCURACY : ±5%(F.S.)

MATERIAL CONSTRUCTION :

PART NAME	MATERIAL	
	STANDARD	OPTION
BODY	SCS14/SUS304	SCS14/SUS316
DIAPHRAGM	CR	FPM
SPRING	SUS304	SUS316
SEAL	NBR	FPM

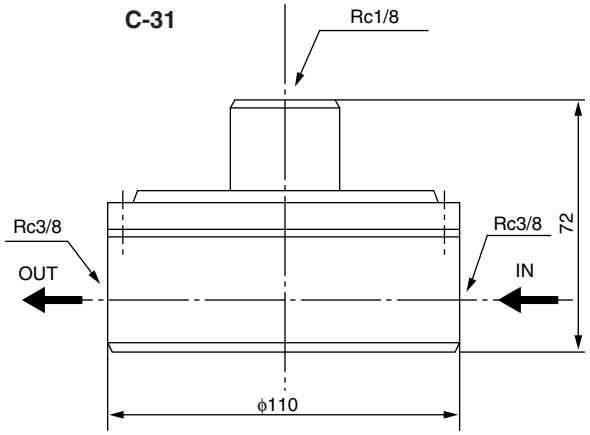
STANDARD PROCESS CONNECTION : Rc3/8Thread

*1: Water (Density 1.0g/cm^3, Viscosity 1.0cP)

*2: Air, 0°C, 0MPa

CP-31-500

● DIMENTION OF CONSTANT FLOW VALVE UNIT



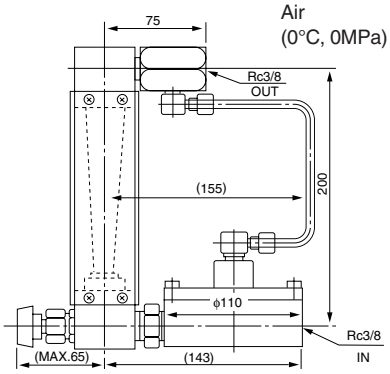
● EXAMPLES OF COMBINATION WITH FLOWMETER

INLET PRESSURE VARIATION CONTROL TYPE

(Also used for OUTLET PRESSURE VARIATION in liquid applications)

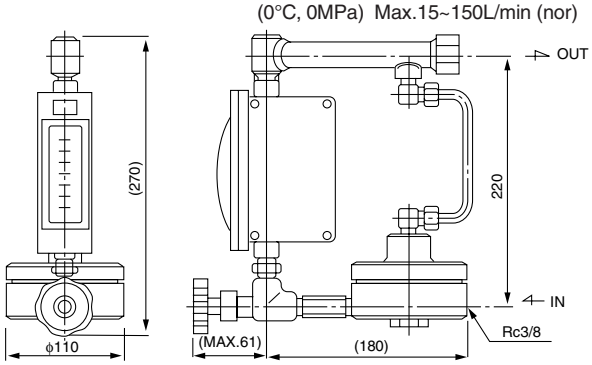
CP-31-500

Possible Scale Ranges as PURGE SET
Water Min.0.2~2L/min.
Max.0.5~5L/min.
Air Min.5~50L/min (nor)
(0°C, 0MPa) Max.15~150L/min (nor)



CM-31-900

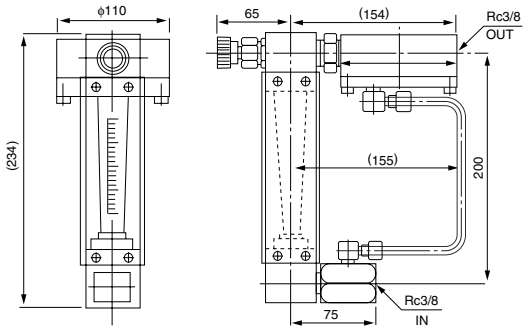
Possible Scale Ranges as PURGE SET
Water Min.0.2~2L/min.
Max.0.5~5L/min.
Air Min.6~60L/min (nor)
(0°C, 0MPa) Max.15~150L/min (nor)



OUTLET PRESSURE VARIATION CONTROL TYPE

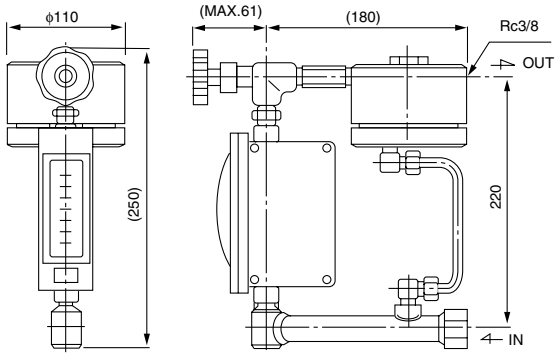
CP-32-500

Possible Scale Ranges as PURGE SET
Air Min.5~50L/min (nor)
(0°C, 0MPa) Max.15~150L/min (nor)



CM-32-900

Possible Scale Ranges as PURGE SET
Air Min.6~60L/min (nor)
(0°C, 0MPa) Max.15~150L/min (nor)



C-4 TYPE

● STANDARD SPECIFICATION

MODEL IDENTIFICATION:

C-41 INLET PRESSURE VARIATION CONTROL TYPE

C-42 OUTLET PRESSURE VARIATION CONTROL TYPE

AVAILABLE FLOW RANGES:

LIQUIDS	:	Max. 10L/min. *1
GASES	:	Max. 300L/min (nor) *2
MAX.OP.PRESS.	:	0.8MPa
TEMP.	:	Max. 120°C

*: It is general data, and the maximum temperature may change by terms of use and environment.

Min. Required DP	:	0.1MPa
Max. Controllable DP	:	0.6MPa
CONTROL ACCURACY	:	±5%(F.S.)

MATERIAL CONSTRUCTION :

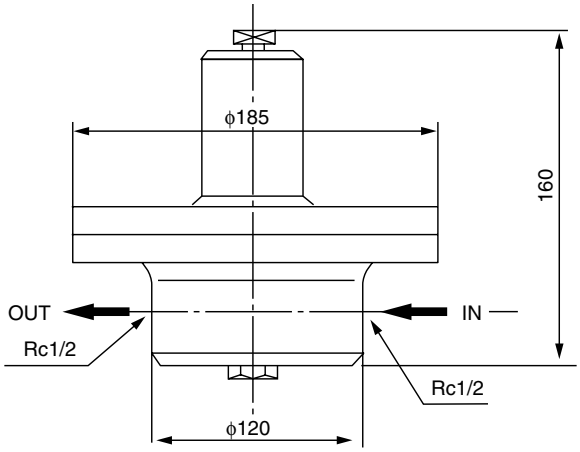
PART NAME	MATERIAL	
	STANDARD	OPTION
BODY	SUS304	SUS316
DIAPHRAGM	CR	FPM
SPRING	SUS304	SUS316
SEAL	NBR	FPM

STANDARD PROCESS CONNECTION : Rc1/2 Thread

*1: Water (Density 1.0g/cm^3, Viscosity 1.0cP)

*2: Air, 0°C, 1atm

● DIMENTION OF CONSTANT FLOW VALVE UNIT



C-41

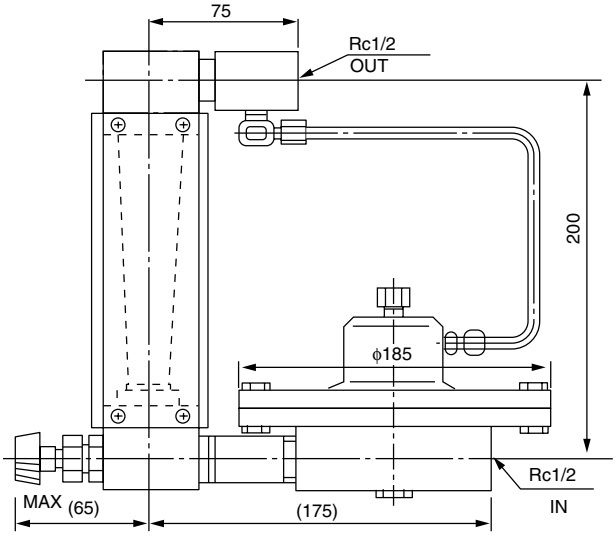
● EXAMPLES OF COMBINATION WITH FLOWMETER

INLET PRESSURE VARIATION CONTROL TYPE

(Also used for OUTLET PRESSURE VARIATION in liquid applications)

CP-41-500

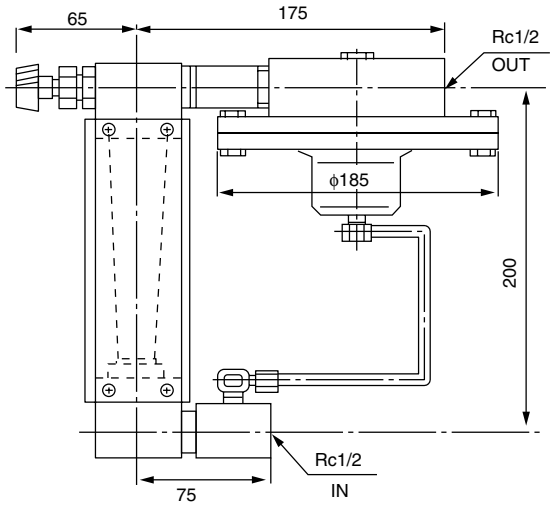
Possible Scale Ranges as PURGE SET
Water Min.0.5~5L/min.
Max.1~10L/min.
Air Min.15~150L/min (nor)
(0°C, 0MPa) Max.30~300L/min (nor)



OUTLET PRESSURE VARIATION CONTROL TYPE

CP-42-500

Possible Scale Ranges as PURGE SET
Air Min.15~150L/min (nor)
(0°C, 0MPa) Max.30~300L/min (nor)



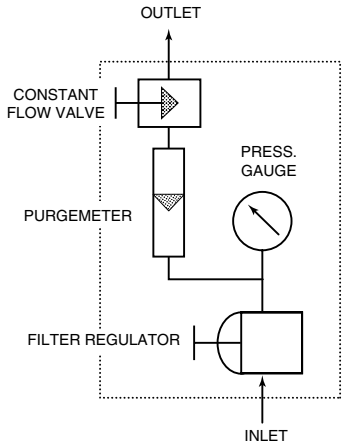
SPECIAL VERSIONS

PANEL MOUNT TYPE

● OUTLINE

This is a combination of ONE purge set, one filter regulator and inlet pressure gauge on one panel board.
The necessary components for air purging are combined in one panel board that offers easy installation at site.
Stable purging flow is maintained even when the secondary (load) pressure varies.

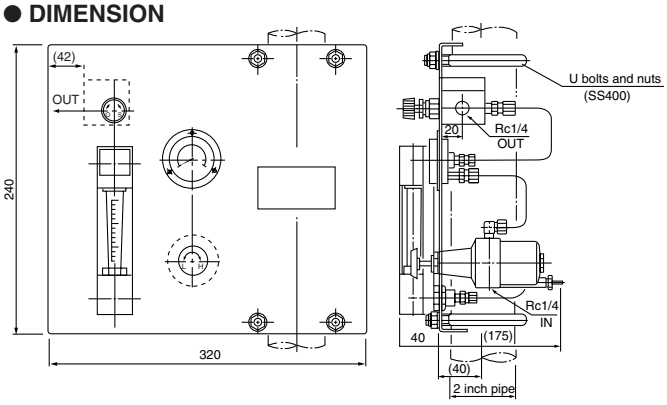
● BLOCK DIAGRAM OF SYSTEM



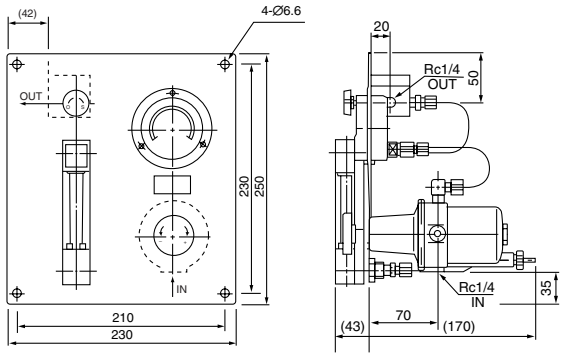
● STANDARD SPECIFICATION

Type : Secondary pressure variation control type
Refer to the specifications of each component.

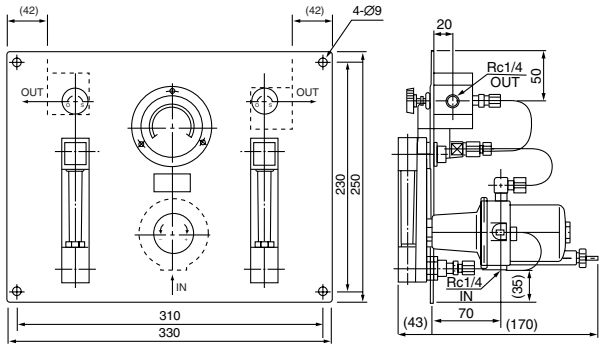
● DIMENSION



U bolt installation on 2 inch pipe CP-121-1AU



Wall or panel mount type CP-121-1AO



Wall or panel mount type CP-121-2AO

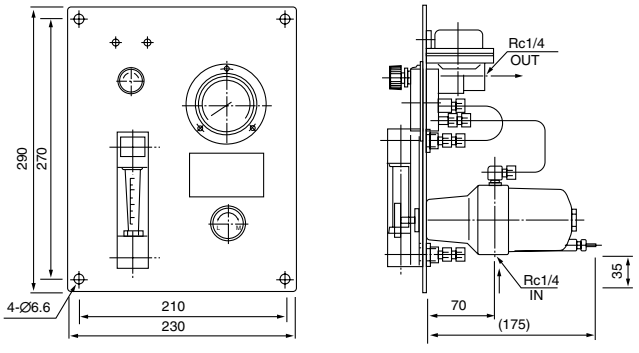
● MODEL CODE

	Constant flow valve		Purge meter model	Purge set Q'ty	Regulator and gauge	Mounting method	Wet part M'tl	Packing M'tl	Diaphragm M'tl	Panel M'tl	Connection	Size	Special
CP-	1	2	1	-1	A	0	-4	N	C	S	-R	2	-Z
													Z
												1	1/8
												2	1/4
												3	3/8
												4	1/2
											R	Rc	
											N	NPT	
										S	SPCC		
										4	SUS304		
										E	Epoxy painting		
									C	CR			
									F	FPM			
								N	NBR				
								C	CR				
								F	FPM				
							4	SUS304					
							6	SUS316					
							Z	Special					
						O	Panel or wall mount						
						U	2 inch pipe						
					A								
				1	Single								
				2	Dual								
			1	P-100-00									
			2	P-200-00									
			4	P-400-00									
		2											
	1	C-12											

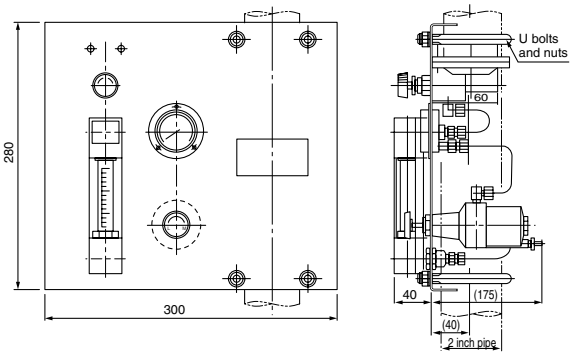
● MODEL CODE

	Constant flow valve		Purge meter model	Purge set Q'ty	Regulator and gauge	Mounting method	Wet part M'tl	Packing M'tl	Diaphragm M'tl	Panel M'tl	Connection	Size	Special
CP-	2	2	1	-1	A	0	-4	N	C	S	-R	2	-Z
													Z
												1	1/8
												2	1/4
												3	3/8
												4	1/2
											R	Rc	
											N	NPT	
										S	SPCC		
										4	SUS304		
										E	Epoxy painting		
									C	CR			
									F	FPM			
								N	NBR				
								C	CR				
								F	FPM				
							4	SUS304					
							6	SUS316					
							Z	Special					
						O	Panel or wall mount						
						U	2 inch pipe						
					A								
				1	Single								
				2	Dual								
			1	P-100-00									
			2	P-200-00									
			4	P-400-00									
		2											
	2	C-22											

● DIMENSION



Wall or panel mount type CP-221-1AO



U bolt installation on 2 inch pipe CP-221-1AU

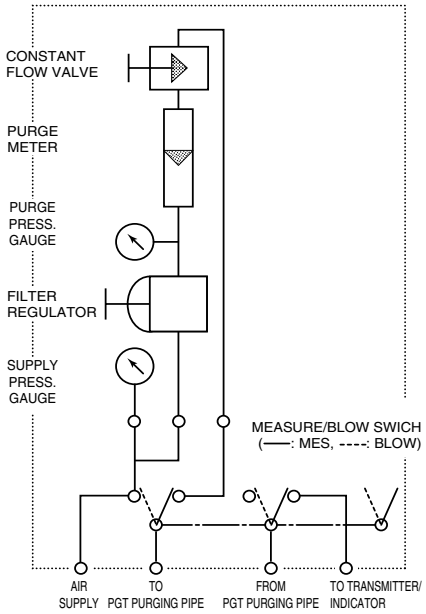
SPECIAL VERSIONS

AIR PURGING LEVEL MEASUREMENT TYPE (With PGT Purging Pipe) CP-22-100-B

● OUTLINE

CP-22-100-B unit consist of a filter regulator, inlet/outlet pressure gauges and change-over valves used for changing of measuring mode or purging mode.
These components are assembled into one panel board for easy installation.
This unit, together with PGT purging pipe, serves for tank level measurement containing solids, particles and sticky liquids.

● BLOCK DIAGRAM OF SYSTEM



● MODEL CODE

	Purge set Q'ty	Mounting method	Wet part M'tl	Packing M'tl	Diaphragm M'tl	Panel M'tl	Connection	Size	Special
CP-22-100-	B		-4	N	C	S	-R	2	-Z
									Z
								1	1/8
								2	1/4
								3	3/8
								4	1/2
							R	Rc	
							N	NPT	
						S	SPCC		
						4	SUS304		
						E	Epoxy painting		
					C	CR			
					F	FPM			
				N	NBR				
				C	CR				
				F	FPM				
			C	C3604/SUS304					
			4	SUS304					
			6	SUS316					
		blank	Panel or wall mount						
		U	2 inch pipe						
		Z	Box type (to be installed on 2 inch pipe)						
	B	Single							
	2B	Dual (Box type not available)							

● STANDARD SPECIFICATION

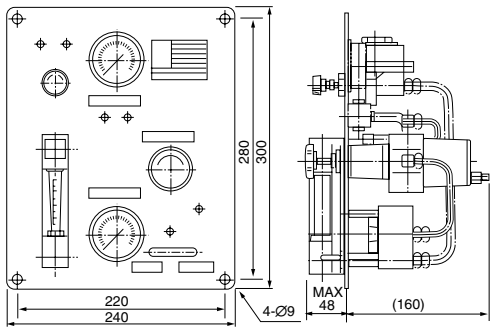
Type	:	Secondary pressure variation control type
Fluid	:	Air
Supply air	:	0.3~0.99MPa
Primary press.	:	To be adjusted to 0.2MPa
Secondary press.	:	0~0.15MPa (This range shows the case when water level is 0 to 15000 mm)
Scale range	:	0.12~1.2L/min (std) (Air, 20°C, 0MPa)
Indication accuracy	:	±5% F.S.
Control accuracy	:	±5% F.S.

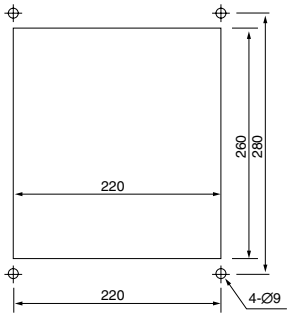
● Special requirements (specify the measuring length)

Type	:	Secondary pressure variation control type
Fluid	:	Air, Nitrogen and others
Supply pressure	:	Max. 0.99 MPa
Setting press. (pressure gauge)	:	Secondary pressure + 0.06MPa
Secondary press.	:	0~ (set press. –0.06 MPa)
Available range (air, 0°C,1atm)		
Min.	:	0.1~1 L/min (nor)
Max.	:	5~ 50 L/min (nor)
Indication accuracy	:	±5% F.S.
Control accuracy	:	±5% F.S

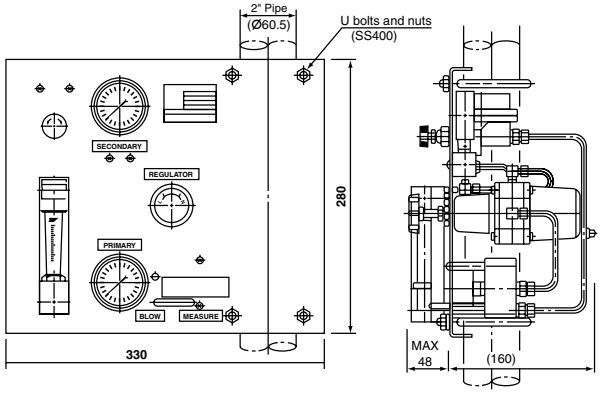
● DIMENSION

Wall or panel mount type CP-22-100-B

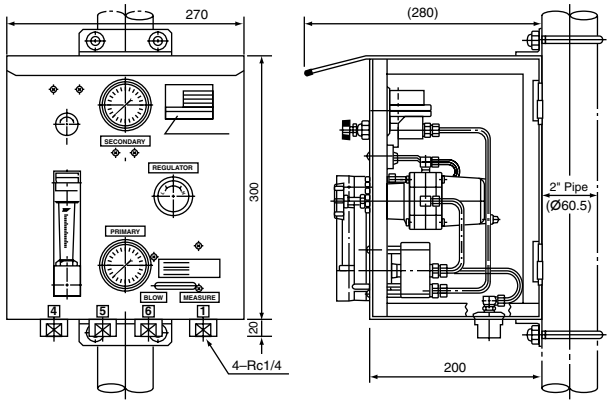


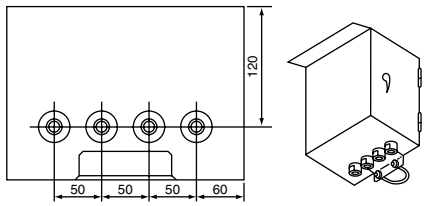


U bolt installation on 2 inch pipe CP-22-100-BU

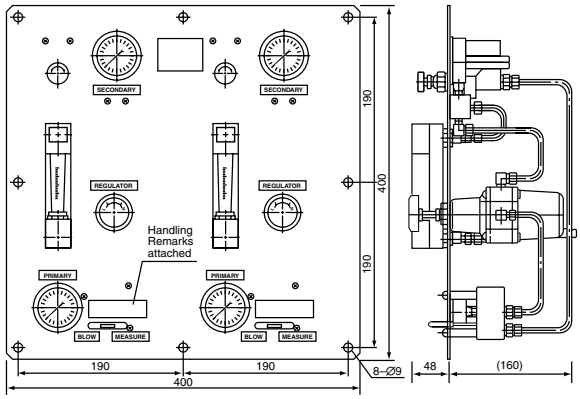


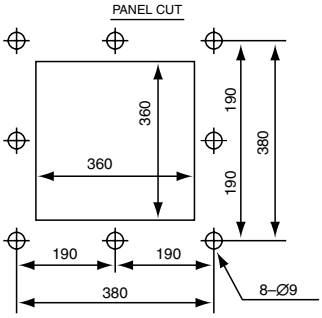
Box type CP-22-100-BZ





Dual type CP-22-100-2B





PGT PURGING PIPE

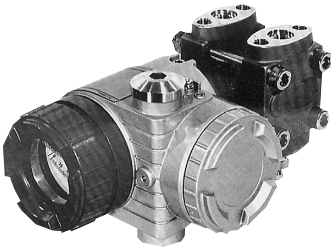
Material	:	SUS304, SUS316 or PVC
Pipe nominal dia.	:	
Stainless steel		10, 15, 20, 25mm
PVC		18, 26mm
Max. measuring length	:	
Stainless steel		16000mm (Connection of measuring length more than 4000mm is socket type)
PVC		Max. 4000mm
Process connection :		
Fixed flange		10 mm ~ 25mm JIS10K
Sliding flange		(Flange location is adjustable) 15 mm ~ 40 mm JIS10K (Other flange standards are available)
Connection of purging gas	:	Rc 1/4 screw (Other screw standards are available)

● OPTION DEVICES

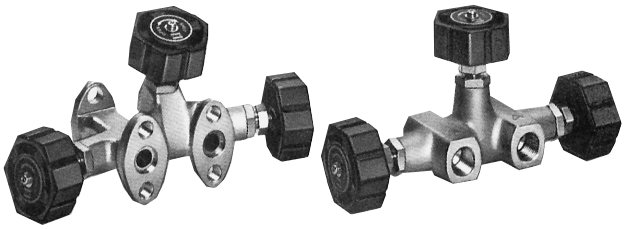
Optional parts to measure level are available.

Contact us if required.

FCX DIFFERENTAL PRESSURE TRANSMITTER



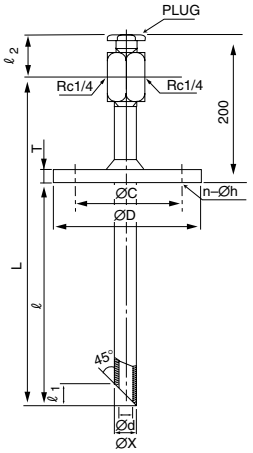
3 WAY VALVE



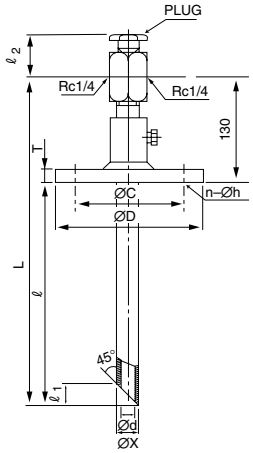
PGT PURGING PIPE

Stainless steel material

Fixed flange



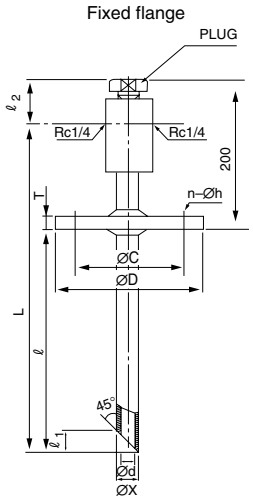
Sliding flange



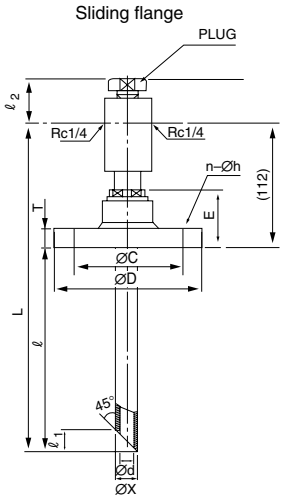
Tube size (ØX)	d	R1	R2	D	C	T	n–h	Flange std.
10A (17.3)	11.3	17.3	46	90	65	12	4–15	FW10AJIS10K
				95	70	12	4–15	FS15AJIS10K
15A (21.7)	15.7	21.7	46	95	70	12	4–15	FW15AJIS10K
				100	75	14	4–15	FS20AJIS10K
20A (27.2)	21.2	27.2	39	100	75	14	4–15	FW20AJIS10K
				125	90	14	4–19	FS25AJIS10K
25A (34)	28	34	39	125	90	14	4–19	FW25AJIS10K
				140	105	16	4–19	FS40AJIS10K

PVC material

Fixed flange



Sliding flange



Tube size (ØX)	d	ℓ1	ℓ2	D	C	T	E	n–h	Flange std.
18A (18)	13	18	46	90	65	17		4–15	FW10AJIS10K
				125	90	14	46	4–19	FS25AJIS10K
26A (26)	20	26	45	100	75	20		4–15	FW20AJIS10K
				140	105	16	46	4–19	FS40AJIS10K

*Specification is subject to change without notice.

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